

REMARKS

The Office Action mailed April 18, 2005 has been carefully reviewed and the foregoing amendment and following remarks are made in consequence thereof.

Claims 1-38 are now pending in this application. Claims 1-3, 5, 6, 8-16, 18-21, 26, and 28-38 stand rejected. Claims 4, 7, 17, 22-25, and 27 are objected to.

The rejection of Claims 1-3, 5, 6, 8-16, 18-21, 26, and 28-38 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,661,865 (Popilock), or, in the alternative, under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 6,661,865 (Popilock) is respectfully traversed.

Popilock describes a diagnostic imaging apparatus including an x-ray tube assembly 20 mounted on the rotating gantry 16 that projects one or more beams of radiation through the subject receiving aperture 18. A collimator 22 collimates the radiation into one or more substantially parallel fan beams of selected thickness and spread or other selected beam cross section. An x-ray detector 26, such as a two-dimensional flat panel, high energy x-ray detector, is rotatably disposed on the rotating gantry across the subject receiving aperture 18 from the x-ray tube 20. At least two nuclear detector heads 30a, 30b are moveably mounted to rotating gantry 16. The acquired x-ray data is reconstructed using a standard CT reconstruction, such as fan beam reconstruction or a volume cone beam reconstruction.

Claim 1 recites a method for performing medical imaging including imaging a patient utilizing a computed tomography imaging modality, the patient between a pencil-beam x-ray source and an x-ray detector...imaging the patient between the pencil-beam x-ray source and the x-ray detector using a nuclear medicine imaging modality.”

Popilock does not describe nor suggest a method that includes imaging a patient utilizing a pencil-beam x-ray source and an x-ray detector, nor does Popilock describe or suggest imaging the patient between the pencil-beam x-ray source and the x-ray detector using a nuclear medicine imaging modality. Rather, in contrast to the

present invention, Popilock describes a diagnostic imaging apparatus including a collimator that collimates the radiation into one or more substantially parallel fan beams of selected thickness and spread or other selected beam cross section and an x-ray detector, such as a two-dimensional flat panel, high energy x-ray detector, wherein the x-ray data is then reconstructed using a standard CT reconstruction, such as fan beam reconstruction or a volume cone beam reconstruction, but Popilock does not describe nor suggest imaging a patient utilizing a pencil-beam x-ray source.

Applicant respectfully submits that the Section 103 rejection of the presently pending claim is not a proper rejection. As is well established, the mere assertion that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Popilock such that imaging was carried out with a pencil-beam X-ray source does not support a prima facie obvious rejection. Rather, each allegation of what would have been an obvious matter of design choice must always be supported by citation to some reference work recognized as standard in the pertinent art and the Applicant given the opportunity to challenge the correctness of the assertion or the notoriety or repute of the cited reference. Applicant has not been provided with the citation to any reference supporting the modification of the Popilock imaging apparatus as made in the rejection. The rejection, therefore, fails to provide the Applicant with a fair opportunity to respond to the rejection, and fails to provide the Applicant with the opportunity to challenge the correctness of the rejection.

Moreover, as is well established, obviousness cannot be established by modifying the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the modification. Popilock does not describe nor suggest the claimed invention. Rather, the present Section 103 rejection appears to be based on a modification of teachings selected from a patent in an attempt to arrive at the claimed invention. Specifically Popilock is cited for its teaching of a diagnostic imaging apparatus including parallel fan beams of selected thickness and spread or other selected beam cross section and an x-ray detector, such as a two-dimensional flat panel wherein the x-ray data is reconstructed using a standard CT reconstruction, such as fan beam reconstruction or a volume cone beam

reconstruction. Since there is no teaching or suggestion in the cited art for the claimed modification, the Section 103 rejection appears to be based on a hindsight reconstruction in which a disclosure has been modified in an attempt to deprecate the present invention. Of course, such a modification is impermissible, and for this reason alone, Applicant respectfully requests that the Section 103 rejection be withdrawn.

Furthermore, if art "teaches away" from a claimed invention, such a teaching supports the nonobviousness of the invention. U.S. v. Adams, 148 USPQ 479 (1966); Gillette Co. v. S.C. Johnson & Son, Inc., 16 USPQ2d 1923, 1927 (Fed. Cir. 1990). In light of this standard, it is respectfully submitted that the cited, as a whole, is not suggestive of the presently claimed invention. Moreover, Applicant submits that Popilock teach away from the present invention, and as such, there is no suggestion or motivation to modify Popilock. Specifically, Popilock describes a diagnostic imaging apparatus including a collimator that collimates the radiation into one or more substantially parallel fan beams of selected thickness and spread or other selected beam cross section and an x-ray detector, such as a two-dimensional flat panel, high energy x-ray detector, wherein the x-ray data is then reconstructed using a standard CT reconstruction, such as fan beam reconstruction or a volume cone beam reconstruction. Moreover, Popilock describes in Claim 1, a transmission radiation detector for detecting the transmission radiation transmitted by the source after passage of the radiation through a transverse imaging slab of the subject in the subject receiving region. Applicant respectfully submits that radiation passing through a transverse imaging slab of the subject refers to a fan beam of radiation rather than a pencil beam.

Further, the present specification describes that a pencil-beam CT system, wherein a relatively narrow, cylindrical beam of x-rays from a relatively less expensive x-ray source are directed towards a relatively inexpensive detector and that a pencil-beam CT system architecture facilitates reducing x-ray scatter, producing a relatively high quality image. Using a pencil-beam x-ray source obviates the need to protect the nuclear medicine detectors from x-ray scatter using movable collimators as described in Popilock. The present specification also describes that a scan using a

pencil-beam CT system typically takes a longer amount of time than scans using typical CT systems such that the pencil-beam CT scan and a nuclear medicine scan may take more nearly the same amount of time to complete. Accordingly, Applicant respectfully submits that Popilock teaches away from the present invention. For at least the reasons above, Claim 1 is submitted to be patentable over Popilock.

Claims 2, 3, 5, 6, and 8-13 depend from independent Claim 1. When the recitations of Claims 2, 3, 5, 6, and 8-13 are considered in combination with the recitations of Claim 1, Applicant submits that dependent Claims 2, 3, 5, 6, and 8-13 likewise are patentable over Popilock.

Claim 14 recites a method for multi modality imaging including “scanning an area using a computed tomography imaging modality, the area between a pencil beam x ray source and an x ray detector...scanning the area using a nuclear medicine imaging modality.”

Popilock does not describe nor suggest a method for multi modality imaging as is described in Claim 14. Specifically, Popilock does not describe nor suggest scanning an area using a pencil-beam x ray source and an x ray detector. Rather, in contrast to the present invention, Popilock describes a diagnostic imaging apparatus including a collimator that collimates the radiation into one or more substantially parallel fan beams of selected thickness and spread or other selected beam cross section and an x-ray detector, such as a two-dimensional flat panel, high energy x-ray detector, wherein the x-ray data is then reconstructed using a standard CT reconstruction, such as fan beam reconstruction or a volume cone beam reconstruction, but Popilock does not describe nor suggest scanning an area using a pencil-beam x ray source and an x ray detector. For at least the reasons above, Claim 14 is submitted to be patentable over Popilock.

Claim 15 depends from Claim 14. When the recitations of Claim 15 are considered in combination with the recitations of Claim 14, Applicant submits that dependent Claim 15 likewise is patentable over Popilock.

Claim 16 recites a multi modality computed tomography system including “a gantry, rotatable about a viewing area...a x ray source coupled to said gantry that provides a pencil beam of x rays, said x ray source configured to direct at least a portion of the pencil beam of x rays into said viewing area...a detector that is responsive to said pencil beam of x rays and that is configured to receive at least a portion of said x rays during a x ray computed tomography portion of a scan...at least one gamma camera configured to receive gamma photons emitted in said viewing area.”

Popilock does not describe nor suggest a multi modality computed tomography system as is described in Claim 16. Specifically, Popilock does not describe nor suggest an x ray source coupled to the gantry that provides a pencil beam of x rays wherein the x ray source is configured to direct at least a portion of the pencil beam of x rays into the viewing area. Rather, in contrast to the present invention, Popilock describes a diagnostic imaging apparatus including a collimator that collimates the radiation into one or more substantially parallel fan beams of selected thickness and spread or other selected beam cross section and an x-ray detector, such as a two-dimensional flat panel, high energy x-ray detector, wherein the x-ray data is then reconstructed using a standard CT reconstruction, such as fan beam reconstruction or a volume cone beam reconstruction, but Popilock does not describe nor suggest an x ray source coupled to the gantry that provides a pencil beam of x rays wherein the x ray source is configured to direct at least a portion of the pencil beam of x rays into the viewing area. For at least the reasons above, Claim 16 is submitted to be patentable over Popilock.

Claims 18-21 depend from independent Claim 16. When the recitations of Claims 18-21 are considered in combination with the recitations of Claim 16, Applicant submits that dependent Claims 18-21 likewise are patentable over Popilock.

Claim 26 recites a multi-modality computed tomography system including “a gantry, rotatable around a substantially rectangular viewing area...a x-ray source coupled to said gantry that provides a pencil-beam of x-rays, said x-ray source configured to direct at least a portion of the pencil-beam of x-rays into said viewing

area, said x-ray source positioned adjacent a first side of the viewing area...a detector that is responsive to said pencil-beam of x-rays and that is configured to receive at least a portion of said x-rays during a x-ray computed tomography portion of a scan, said detector positioned on a second side of the viewing area opposite said first side...a gamma camera configured to receive gamma photons emitted in said viewing area, said gamma camera positioned on at least one of a third side of the viewing area and a fourth side of the viewing area wherein the third and the fourth sides are each positioned between the first and second sides in an opposing arrangement.”

Popilock does not describe nor suggest a multi modality computed tomography system as is described in Claim 26. Specifically, Popilock does not describe nor suggest an x-ray source coupled to the gantry that provides a pencil-beam of x-rays. Rather, in contrast to the present invention, Popilock describes a diagnostic imaging apparatus including a collimator that collimates the radiation into one or more substantially parallel fan beams of selected thickness and spread or other selected beam cross section and an x-ray detector, such as a two-dimensional flat panel, high energy x-ray detector, wherein the x-ray data is then reconstructed using a standard CT reconstruction, such as fan beam reconstruction or a volume cone beam reconstruction, but Popilock does not describe nor suggest an x ray source coupled to the gantry that provides a pencil beam of x rays wherein the x ray source is configured to direct at least a portion of the pencil beam of x rays into the viewing area. For at least the reasons above, Claim 26 is submitted to be patentable over Popilock.

Claims 28-30 depend from independent Claim 26. When the recitations of Claims 28-30 are considered in combination with the recitations of Claim 26, Applicant submits that dependent Claims 28-30 likewise are patentable over Popilock.

Claim 31 recites a multi-modality imaging system including “a pencil-beam x-ray computed tomography (CT) portion...a nuclear medicine imaging portion.”

Popilock does not describe nor suggest a multi modality computed tomography system as is described in Claim 31. Specifically, Popilock does not

describe nor suggest a pencil-beam x-ray computed tomography (CT) portion. Rather, in contrast to the present invention, Popilock describes a diagnostic imaging apparatus including a collimator that collimates the radiation into one or more substantially parallel fan beams of selected thickness and spread or other selected beam cross section and an x-ray detector, such as a two-dimensional flat panel, high energy x-ray detector, wherein the x-ray data is then reconstructed using a standard CT reconstruction, such as fan beam reconstruction or a volume cone beam reconstruction, but Popilock does not describe nor suggest an x ray source coupled to the gantry that provides a pencil beam of x rays wherein the x ray source is configured to direct at least a portion of the pencil beam of x rays into the viewing area. For at least the reasons above, Claim 31 is submitted to be patentable over Popilock.

Claims 32-38 depend from independent Claim 31. When the recitations of Claims 32-38 are considered in combination with the recitations of Claim 31, Applicant submits that dependent Claims 32-38 likewise are patentable over Popilock.

For the reasons set forth above, Applicant respectfully requests that the Section 102 and Section 103 rejection of Claims 1-3, 5, 6, 8-16, 18-21, 26, and 28-38 be withdrawn.

The rejection of Claims under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 6,661,865 (Popilock) in view of U.S. Patent No. 6,661,865 (Townsend) is respectfully traversed.

Popilock is described above. Townsend describes a combined PET and X-Ray CT tomograph for acquiring CT and PET images sequentially in a single device, overcoming alignment problems due to internal organ movement, variations in scanner bed profile, and positioning of the patient for the scan. Townsend describes that a rapid, post-injection, transmission scan is performed immediately before and/or during the PET emission scan so as to minimize the effects of patient movement.

Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed

invention, absent some teaching, suggestion, or incentive supporting the combination. Neither Popilock nor Townsend, considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicants respectfully submit that it would not be obvious to one skilled in the art to combine Popilock with Townsend, because there is no motivation to combine the references suggested in the art. Additionally, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicants' own teaching. Rather, only the conclusory statement that "it would have been obvious to one having ordinary skill in the art to at the time the invention was made to modify the method (and apparatus) of Popilock such that it comprised the step of performing the CT and nuclear medicine imaging simultaneously," suggests combining the disclosures.

Applicants respectfully traverse the assertion in the Office Action that it would have been obvious to modify the method (and apparatus) of Popilock such that it comprised the step of performing the CT and nuclear medicine imaging simultaneously. Popilock describes, at Column 7, lines 10-40, that the plurality of substantially parallel vanes are initially closed such that they block scattered radiation from reaching the scintillator. This mode protects the scintillator from high energy radiation events originating from the x-ray source or other source of penetrating radiation. Once the vanes of the variable axial radiation shield are closed, a CT data acquisition is performed. Upon completion of the CT data acquisition, the subject is injected with a radiopharmaceutical. When equilibrium is reached with regard to the radiopharmaceutical, the plurality of substantially parallel vanes are pivoted such that they are oriented substantially perpendicular to the scintillator in a radiation collimating mode. Applicants respectfully submit that combining Popilock with Townsend would render the imaging apparatus inoperable. Popilock describes that the vanes are closed during a CT scan to protect the nuclear medicine detectors from saturation of and/or damage to the detector heads from scattered x-rays. Accordingly, imaging using CT and nuclear medicine simultaneously is not possible as described in Popilock. As such, no expectation of success for the combination of Popilock and Townsend has been shown.

As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicants' disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion nor motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Specifically, Popilock describes an imaging apparatus that requires the radiation shield covering the nuclear medicine detector heads to be closed during a CT scan and Townsend describes performing a CT and nuclear medicine scan simultaneously. Since there is no teaching nor suggestion in the cited art for the combination, and the cited art teaches away from each other, the Section 103 rejection is clearly based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicants request that the Section 103 rejection be withdrawn.

Moreover, if art "teaches away" from a claimed invention, such a teaching supports the nonobviousness of the invention. U.S. v. Adams, 148 USPQ 479 (1966); Gillette Co. v. S.C. Johnson & Son, Inc., 16 USPQ2d 1923, 1927 (Fed. Cir. 1990). In light of this standard, it is respectfully submitted that the cited art, as a whole, is not

suggestive of the presently claimed invention. Specifically, Applicants respectfully submit that a simultaneous CT and nuclear medicine scan is not possible as described by Popilock. Accordingly, Popilock and Townsend teach away from each other, and as such, any combination of the cited art appears to support the nonobviousness of the present invention.

In addition, and to the extent understood, neither Popilock nor Townsend, describes or suggests the claimed invention. Specifically, Claim 1 recites a method for performing medical imaging including imaging a patient utilizing a computed tomography imaging modality, the patient between a pencil-beam x-ray source and an x-ray detector...imaging the patient between the pencil-beam x-ray source and the x-ray detector using a nuclear medicine imaging modality.”

Neither Popilock nor Townsend describes nor suggests a method that includes imaging a patient utilizing a pencil-beam x-ray source and an x-ray detector, nor does Popilock or Townsend describe or suggest imaging the patient between the pencil-beam x-ray source and the x-ray detector using a nuclear medicine imaging modality. Rather, in contrast to the present invention, Popilock describes a diagnostic imaging apparatus including a collimator that collimates the radiation into one or more substantially parallel fan beams of selected thickness and spread or other selected beam cross section and an x-ray detector, such as a two-dimensional flat panel, high energy x-ray detector, wherein the x-ray data is then reconstructed using a standard CT reconstruction, such as fan beam reconstruction or a volume cone beam reconstruction and Townsend describes a combined PET and X-Ray CT tomograph for performing a transmission scan immediately before and/or during the PET emission scan, but neither Popilock nor Townsend describes nor suggests imaging a patient utilizing a pencil-beam x-ray source. Accordingly, for at least the reasons set forth above, Claim 1 is submitted to be patentable over Popilock in view of Townsend.

Claim 2 depends directly from independent Claim 1. When the recitations of Claim 2 are considered in combination with the recitations of Claim 1, Applicants

submit that dependent Claim 2 likewise is patentable over Popilock in view of Townsend.

Claim 16 recites a multi modality computed tomography system including “a gantry, rotatable about a viewing area...a x ray source coupled to said gantry that provides a pencil beam of x rays, said x ray source configured to direct at least a portion of the pencil beam of x rays into said viewing area...a detector that is responsive to said pencil beam of x rays and that is configured to receive at least a portion of said x rays during a x ray computed tomography portion of a scan...at least one gamma camera configured to receive gamma photons emitted in said viewing area.”

Neither Popilock nor Townsend, considered alone or in combination, describes nor suggests a multi modality computed tomography system as is described in Claim 16. Specifically, neither Popilock nor Townsend describes or suggests an x ray source coupled to the gantry that provides a pencil beam of x rays wherein the x ray source is configured to direct at least a portion of the pencil beam of x rays into the viewing area. Rather, in contrast to the present invention, Popilock describes a diagnostic imaging apparatus including a collimator that collimates the radiation into one or more substantially parallel fan beams of selected thickness and spread or other selected beam cross section and an x-ray detector, such as a two-dimensional flat panel, high energy x-ray detector, wherein the x-ray data is then reconstructed using a standard CT reconstruction, such as fan beam reconstruction or a volume cone beam reconstruction and Townsend describes a combined PET and X-Ray CT tomograph for performing a transmission scan immediately before and/or during the PET emission scan. For at least the reasons above, Claim 16 is submitted to be patentable over Popilock in view of Townsend.

Claim 18 depends from independent Claim 16. When the recitations of Claim 18 are considered in combination with the recitations of Claim 16, Applicant submits that dependent Claim 18 likewise is patentable over Popilock in view of Townsend.

Claim 31 recites a multi-modality imaging system including "a pencil-beam x-ray computed tomography (CT) portion...a nuclear medicine imaging portion."

Neither Popilock nor Townsend, considered alone or in combination, describes nor suggests a multi modality computed tomography system as is described in Claim 31. Specifically, neither Popilock nor Townsend describes or suggests a pencil-beam x-ray computed tomography (CT) portion. Rather, in contrast to the present invention, Popilock describes a diagnostic imaging apparatus including a collimator that collimates the radiation into one or more substantially parallel fan beams of selected thickness and spread or other selected beam cross section and an x-ray detector, such as a two-dimensional flat panel, high energy x-ray detector, wherein the x-ray data is then reconstructed using a standard CT reconstruction, such as fan beam reconstruction or a volume cone beam reconstruction, but Popilock does not describe nor suggest an x ray source coupled to the gantry that provides a pencil beam of x rays wherein the x ray source is configured to direct at least a portion of the pencil beam of x rays into the viewing area. For at least the reasons above, Claim 31 is submitted to be patentable over Popilock in view of Townsend.

Claims 33 and 36 depend from independent Claim 31. When the recitations of Claims 33 and 36 are considered in combination with the recitations of Claim 31, Applicant submits that dependent Claims 33 and 36 likewise are patentable over Popilock in view of Townsend.

For the reasons set forth above, Applicant respectfully requests that the Section 103 rejection of Claims 2, 18, 33, and 36 be withdrawn.

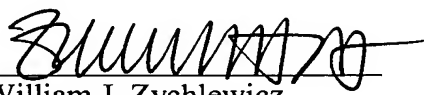
Claims 4, 7, 17, 22-25, and 27 were indicated as being allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 4 and 7 depend from independent Claim 1 which is submitted to be in condition for allowance. When the recitations from Claims 4 and 7 are considered in combination with the recitations of Claim 1, Applicant submits that Claims 4 and 7 likewise are patentable over Popilock in view of Townsend.

Claims 17 and 22-25 depend from independent Claim 16 which is submitted to be in condition for allowance. When the recitations from Claims 17 and 22-25 are considered in combination with the recitations of Claim 16, Applicant submits that Claims 17 and 22-25 likewise are patentable over Popilock in view of Townsend.

Claim 27 depends from independent Claim 26 which is submitted to be in condition for allowance. When the recitations from Claim 27 are considered in combination with the recitations of Claim 26, Applicant submits that Claim 27 likewise is patentable over Popilock in view of Townsend.

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,


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